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(54) Title: **CARBON NANOSTRUCTURE-BASED ELECTROCATALYTIC ELECTRODES**

(57) Abstract: Carbon nanostructure (e.g., CNF) electrodes disclosed herein may be conveniently prepared on conductive substrates by pyrolysis of an organometallic nanostructure precursor in a reducing atmosphere. Such electrodes may possess suitable properties for preparation of electrocatalytic electrodes and electrochemical sensors. High surface area nitrogen doped CNFs prepared according to certain embodiments are conductive and may exhibit high stability and improved catalytic activity for O<sub>2</sub> reduction in aqueous solutions.

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